DEPARTMENT OF NOTES AND REVIEWS

It is the purpose, in this department, to present from time to time brief original notes, both of methods of work and of results, by members of the Society. All members are invited to submit such items. In addition to these there will be given a few brief abstracts of recent work of more general interest to students and teachers. There will be no attempt to make these abstracts exhaustive. They will illustrate progress without attempting to define it, and will thus give to the teacher current illustrations, and to the isolated student suggestions of suitable fields of investigation.—[Editor.]

ENTOMOLOGICAL ABSTRACTS

Position of Micropterygidae —Tillyard (1919, Proc. Linn. Soc. N. S. Wales, 44:95–136) has made an extensive study of the remarkable family of archaic moths, the *Micropterygidae.* Chapman (1917) removed the genus *Micropteryx* from the remainder of the family and proposed a new order, Zeugloptera, for its reception. Comstock (1918), on the other hand, removed the whole family *Micropterygidae* from the Lepidoptera and placed it as a new suborder of the Trichoptera. Tillyard finds no justification for either of these views. The proposed "Zeugloptera" is found to lack a single character not found in some other order. In all of the Micropterygidae M_4 does not occur as a separate vein of the forewing; the characteristic trichopterous wing-spot is lacking; the pupal wing-tracheation is complete; the scales are broad and possess numerous striae; and functional frenula are present. These characters definitely rule out the possibility of these insects being Trichoptera, and necessitate the conclusion that that they must be archaic Lepidoptera.

Micropterygidae.—Braun (1919, Ann. Ent. Soc. Am., 12:349–367) has also attacked the problem of the position of the Micropterygidae. A study of wing structure in the primitive Lepidoptera shows, according to this writer, that while the Micropterygidae stand close to the common ancestor of Lepidoptera and Trichoptera they are true Lepidoptera and have given rise to all of the remainder of that order by several divergent lines, one represented by the Nepticulidae, another by the Hepialidae, and a third "much branched line includes the frenate Lepidoptera, of which some members such as the Prodoxidae, Incurvariidae, etc., conserve some of the trichopterous characters of their ancestry and must therefore be regarded as the most primitive of the Frenatae."

Filariasis in U. S.—Francis (1919, U. S. Publ. Health Service, Hygienic Lab. Bull. No. 117) reports on a study of filariasis in Southern United States. *Filaria bancrofti* is the species concerned and one endemic focus has been located in this country at Charleston, S. C. Of 400 individuals examined in that city, 77 were infected with microfilaria, whereas of 1,470 examinations in nine southern cities outside of Charleston only 9 showed infection. The data indicated that cases outside of Charleston have derived the infection either from residence in Charleston or from residence at some place outside of the United States, as in Cuba. Transmission occurs only through the mosquito, but the certainty of the process is limited by the following facts: (1) No multiplication of the filaria in the mosquito; (2) The small number actually passing successfully through the mosquito; and the still smaller number which reach the lymph glands of man; (3) Male and female filaria must find lodgment in the same lymph gland of man in order that reproduction occur; (4) Infection of mosquitoes can occur only during a few hours before and after midnight; (5) The biting act of the mosquito only drops the microfilaria on the free surface of the skin of man whence it must penetrate the intact skin. The mosquito, *Culex fatigans*, was found to be the transmitter. The anatomy of the mosquito proboscis in relation to filaria transmission is discussed and the inward and outward courses of the filariae pointed out. The former is through the stilette bundle along with the ingested blood, while the latter is through the interior of the labium. Eight well executed plates, mostly in color, add to the value of the paper.

Polyembryony and Sex.—Patterson (1919, Journ. Heredity, 10:344-352) reports results of a study of the origin and development of mixed broods in polyembryonic Hymenoptera and the ratio in production of males and females. In 162 broods of *Copidosoma gelechiae*, 90 were female, 62 male and 10 mixed. The sex ratio was found to be approximately 3 females to 2 males. The great excess of females in four of the mixed broods suggested the possibility that both sexes might arise from a single fertilized egg. In *Paracopidosomopsis floridanus*, 1.7% of the broods were pure female, 11.3% pure male, and 87% mixed. The percentage of males varied from 0.06 to 72.07 and in over 58% of the broods less than 10% of the individuals in any brood were males. In *Platygaster rubi* not a single pure male brood was found. This, however, might be explained by the prevailing conditions which make it unusual that an unfertilized female might escape. Only 6 of the 105 broods were pure female. In the 99 mixed broods, the number of females, in every brood, exceeded the number of males. In 53 broods only one male per brood appeared, 17 had 2 males each, and 13 had 3 each. The other broods showed a varying number, but not exceeding 10. That some mixed broods result from two parasitic eggs, one from a fertilized female and one from a virgin female, seems very probable but two diffiulties stand in the way of the exclusive application of this application, namely, (1) simultaneous emergence of individuals of a mixed brood, and (2) striking predominance of females over the males in the great majority of broods. A *Paracopidosomopsis* female, in about 66% of the cases, deposits two eggs in the host egg at a single oviposition, and in the majority of cases both eggs were found to be fertilized. A host egg mass of 28 eggs exposed to a mixed brood of parasites yielded 14 with 1 parasitic egg, 11 with 2 each, and 3 with 3 each. Eight of the 11 indicated two ovipositions, while 3 seemed to represent one oviposition. In each of the 3 remaining eggs the three parasitic eggs apparently represented different ovipositions. Therefore the two-egg explanation seems inadequate for the mixed broods of *Platygaster*. It is proposed that some of the mixed broods may result by one fertilized egg giving rise to both sexes through abnormal behavior of the two sex chromosomes during early cleavage, as for example, somatic non-disjunction in which certain blastomeres receiving but one x chromosome would produce male embryos.

Origin and Significance of Metamorphosis.—Crampton (1919, Bull. Brooklyn Ent. Soc., 14:33-40; 93-101) considers critically the problems of origin and significance of metamorphosis in insects. Presence or absence of metamorphosis, although worthy of careful consideration, cannot be regarded as an important factor in determining the relationships of insects, according to this writer. An ancestral group, it is contended, may include some forms which have "developed the tendency towards a metamorphosis, to a marked degree, while other representatives of the same ancestral group do not exhibit any marked indications of such a tendency." Plecoptera, Embiidae, Dermaptera, Coleoptera and their allies constitute the "plecopteroid superorder" and are regarded as the ancestral group from which the higher insects were derived. This group contains forms exhibiting well marked metamorphosis and some which do not. The higher forms are divided into two super orders: (1) the "psocoid superorder" containing the Psocodae, Mallophaga, Anopleura (Pediculidae, s.b.), Hemiptera, Homoptera and their allies—a group in which few members exhibit traces of metamorphosis; and (2) the "neuropteroid superorder" comprising the Neuroptera, Hymenoptera, Mecoptera, Diptora, Siphonaptera, Trichoptera, Lepidoptera and their allies, all being predominantly holometabolous. Thus it is suggested that we might expect the coleopterous representatives of the ancestral group to be somewhat nearer the derived holometabolous group, while the remaining representatives of the ancestral group would be nearer the derived non-metabolous group. To account for the origin of metamorphosis among some of the ancestral forms, it is thought that there arose a tendency (by mutation, etc.) of the immature stages to differ from the adults, resulting eventually in stages which could enter an environment untenable by the adult. Such forms, favored by natural selection, would tend to persist and thus there would appear a "propensity towards the production of complete metamorphosis." Against the claim of Handlirsch that *cold* produced metamorphosis, Crampton argues that "insects in which the tendency toward metamorphosis was *already well developed*, were better equipped than their less fortunate fellows, to penetrate the less favorable regions of winter-frost, etc., and there establish themselves." No support is found in embryology or palaeontology for the view that larval stages represent "free-living embryos." Disagreement with any view that environment *causes* metamorphosis is expressed. The pupal stage is regarded as the "making over" period necessitated when immature and adult stages come to differ so markedly that a great change must be involved in the transition. Larvae stages are regarded by this author as having some phylogenetic significance and may yield valuable hints as to relationships. Whether primitive types of larvae represent ancestral conditions more nearly than adults do seems uncertain. In some cases it seems to be true but in other instances the larvae have become far more specialized than the adult, thus involving secondary characters.

PAUL S. WELCH

Department of Zoology,
University of Michigan